such cases few would doubt its efficacy in some patients. When, however, results are tabulated and impartial statistical methods applied, they are so far from upholding the impressions created by these few cases that the statistical methods themselves, and not the results of tuberculin, are questioned.

My observation leads me to believe that incipient cases treated with tuberculin do somewhat better than those not so treated, while the moderately advanced cases do much better. The ultimate results do not show such marked differences, but indicate that the treated, both incipient and moderately advanced, do better.

REST VERSUS CLIMATE IN THE TREATMENT OF PULMONARY TUBERCULOSIS.[1]

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The world is still knocking at the door of the medical profession asking for a cure for its greatest scourge, and we who are particularly interested in the treatment of pulmonary tuberculosis are certainly anxious to unite upon some sane rational therapy pending the discovery of a true specific.

Phthisiotherapists agree upon but one point, namely, that tuberculosis is curable. Their mode of procedure in effecting this cure varies to a considerable degree. As an example of this, two years ago I was able to collect 75 varieties of tuberculin in the market, each with its champions and devotees, claiming some particular merit for their special brand, seemingly forgetful of the fact that tuberculin is a product of the tubercle bacillus, call it by what name you will, and that success in treatment depends not so much upon the form used as upon its dosage and mode of administration.

So has it been with other measures for the treatment of tuberculosis as its therapy has evolved through the centuries from Hippocrates and Aretaeus, who knew little about it, down to Robert Koch, who has given us our present-day conception of the disease. Climatic treatment ruled supreme for many years, and particularly in the United States. It became the rule when a patient was pronounced tuberculous to send him to another climate—warmer, drier, higher, or lower—than his own. Colorado, California, Arizona, and New Mexico became the favored resorts, the four

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[1] Read at the Seventh International Tuberculosis Congress held at Rome, April 14 to 20, 1912.

Meccas to whose shrines thousands of misdirected tuberculous individuals have gone, the major portion of whom never returned.

In the majority of cases the doctor is responsible for sending his patient away from home, either from a belief that another climate will benefit him or because (which unfortunately is too often the case) his own therapeutic resources are at an end and he wishes to put the responsibility of the death of his patient upon someone else. I wish to state emphatically that I consider it criminal to send an advanced case of tuberculosis away from home under the delusion that another climate will cure him. Any physician of the Pacific Coast, and particularly we in California, can bear testimony to having seen innumerable cases of advanced tuberculosis, sent by their physicians, for whom absolutely nothing could be done. Let us once for all put every personal or material consideration aside and come out boldly for this principle: That climate *per se* plays but a very small role in the present-day treatment of pulmonary tuberculosis. Most of us believe this, some still doubt, some still have faith in the high altitude treatment, some in the dry air climate, some in a change from any climate to any climate.

I can readily understand that a climate which has a maximum amount of sunshiny days in the year will prove more cheerful to a patient than one where it constantly rains. Upon this ground alone can I see much merit in change of climate. Where a patient is depressed and firmly convinced that he cannot get well a change of scene and a brightening of his surroundings may become important. But the unqualified transference of tuberculars from one climate to another without individualization is bad therapeutics.

We see more tuberculosis in California than in any part of the United States with the possible exception of Colorado, which proves that physicians do not yet recognize the truth that climate unaided never did and never will cure tuberculosis. A considerable proportion of the fairly advanced cases, which I see in both clinical and private practice is composed of patients who have been to one or more sanatoria for a cure. This certainly must be the experience of other physicians in California interested in tuberculosis and goes to prove that the tubercular who cannot be cured at home cannot be cured elsewhere, other things being equal. Why do we still constantly persist in the blunder of making a fetish of climate, imbuing the mind of the sufferer with its almost supernatural influence, and as a result causing him to live uncontrolled and unadvised, always getting worse but believing the contrary? To remedy this error medical men must be convinced that tuberculosis, particularly the pulmonary form, is a disease of metabolism, a disease of cell destruction, a disease of tissue waste, a disease where bacteria are locked up in bronchioles, generating toxins, and that our only chance of arresting this devastation is to stimulate the natural defences within the body, the antibodies. Climate cannot do this. All the grand results attributed to climate in the past have been due to open air, food, and the control within a sanatorium. Air is air whether high or low, and can be obtained in any climate. The open air and sanatorium treatment must be distinctly differentiated from so-called climatic treatment. If you send cases to a distinct locality for the purpose of getting care, proper medical attention, and better facilities than can be obtained at home no fault can be found. But the physician first and the patient secondly must learn that in treating pulmonary tuberculosis we are attempting to stop waste; we are attempting to check toxemia; we are striving to put the body in such condition that the introduction of artifical toxins will stimulate its natural defences and form a maximum amount of antibodies. Only in this way do I believe we will be able to create out of the experience of the past a rational tuberculosis therapy.

At the last Tuberculosis Congress, Williams, of London, covered these points most ably by stating "that the history of consumption has ever shown that more has been accomplished by measures which augment and reinvigorate the resisting powers of the sufferer than by measures which aim at destroying or rendering harmless the invading tubercle bacillus."

Sewall, of Denver, in a recent article on open air, concluded that there was no existing proof that the increase of carbon dioxide, the decrease of oxygen, or the addition of organic animal matter under ordinary circumstances could prove deleterious to health. Air cannot destroy the effects of the tubercle bacillus primarily. Air simply does its share in stimulating metabolic change.

Osler has said that a man with beginning tuberculosis may fight a winning battle if he lives out of doors in any climate whether high, dry, cold, low, moist, or warm.

What then becomes our duty in the treatment of a curable case of pulmonary tuberculosis? As I see it after struggling with the problem for several years, tempering personal experience and failure with the experience and failures of others, it is plainly to build up a faulty metobolism and if possible produce an immunization. For my own guidance I have tabulated tuberculosis therapy as follows, each heading in its relative degree of importance: (1) Rest; (2) diet; (3) open air; (4) tuberculin therapy; (5) climate.

I am firmly convinced and shall try and prove my position by the record of results which are given later that rest is our most important therapeutic agent in the treatment of pulmonary tuberculosis. Brehmer was the first to introduce a system of graduated exercise into the treatment of tuberculosis. His work has been augmented and improved upon by Paterson at the Brompton Sanatorium, Frimley. Latham also in treating his patients insists upon rest and graded exercise as the best therapeutic agent for reducing fever and toxemia and controlling the danger of autoinoculation.

We all recognize the value of open air for twenty-four hours daily if possible. We sanction caloric feeding, which means not overfeeding, not forcing the organism to assimilate beyond its power, but sufficient feeding to restore body-weight to normal. In a particular individual most of us believe in tuberculin therapy, the conviction gradually becoming fixed that it will some day become a true specific, but we are not all ready to accept the doctrine of the importance of rest applied scientifically. Formerly a patient was told "to go west and rough it." For this reason the physician on the western coast of the United States has been able to see so many cases of tuberculosis. Those who come west and rough it uncontrolled seldom get well. Often, too, we see the arrested case breaking down through overstrain.

Rest means freedom both from physical and mental strain. Rest should be applied in fairly accurate dosage just as we figure out diet in calories and our tuberculin in milligrams. It is not sufficient to tell the patient to take plenty of rest and not to walk too much, and not to engage in mental worry or work. The number of hours of rest *per diem* should be prescribed, and if mental strain is present the doctor should acquire the patient's confidence, learn its nature, and if possible remove it.

Again, the importance of graduated rest and exercise in administering tuberculin cannot be too strongly dwelt upon. Tuberculin reactions, failure to acquire arrest or retrogression of a tuberculous process may often be attributed to our forgetting that autoinoculation goes on continually within the body of the tubercular, that tuberculin itself is being produced, and that antibodies are being generated. If we are ever to obtain an immunity in tuberculosis it can only be by creating a proper balance, that is, by administering the toxin (tuberculin) for the purpose of supporting and stimulating the natural defences already in the body, the antibodies. Any scientific theory which has been developed, whether the Arloing and Courmont agglutinin theory, the Bordet and Gengou antibody theory, or the antituberculin hypothesis of Wassermann and Bruck, cannot overcome the truth that tuberculin can only become the true specific of the future if we realize that we do not inject antibodies, but stimulate those already in the body.

Following the experience of Nathan Raw,[2] with bovine T. R. I began injecting my cases with bovine tuberculin, and in October, 1910, reported[3] 28 cases, of which 15 were apparently cured or arrested. I consider this result most satisfactory and attributed it to the greater efficacy of the bovine tuberculin over the human form in the treatment of pulmonary tuberculosis.

I have continued in the exclusive use of this form of tuberculin and can now report 210 cases in which the results have practically been as good as in the original 28. But I have changed my viewpoint somewhat, and although still believing that bovine tuberculin is the toxin of choice in the treatment of tuberculosis caused by Bacillus typus humanus, I must attribute my results primarily to the enforced rest to which all my patients are subject. We err if we do not appreciate that tuberculosis with fever is like any other disease with fever, the result of bacillemia and toxemia and should be treated with rest in bed, that tuberculosis with emaciation is like any other devastating process and needs rest; that tuberculosis with weakness is like myocardial weakness and needs rest if we are to acquire proper functional restitution.

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[2] Lancet, February 10, 1908.

[3] California State Jour. Med.

In order to prove the assertion that rest is the most important agent in our therapeutic armament for fighting tuberculosis, I have procured records from most of the large sanatoria upon the Pacific Coast and in Colorado, in order to compare them with my own results obtained in San Francisco. The directors of the various sanatoria were written to and the results as herein given (see Table on p. 540) are taken from their personal statements.

In a comparison of the results obtained by various observers in their respective localities as shown in the following table some facts stand out rather prominently. The greatest percentage of apparent cures has been obtained by the Pottenger Sanatorium and the National Jewish Hospital at Denver; the greatest percentage of arrests by the Colfax School for the Tuberculous; the Barlow Sanatorium at Los Angeles, and myself; the greatest number of improvements by the Walter Henry Memorial Sanatorium at Seattle and the United States Naval Hospital at Las Animas, Colorado, and the United States Army Hospital at Fort Bayard, New Mexico. The altitude of the two last named sanatoria are respectively 3800 and 6100 feet and the absence of successful result (cures and arrests) is accounted for by the fact that most of the cases at Fort Bayard are chronic, being discharged tuberculars from the United States army, and a great many sent to Las Animas are advanced. The two sanatoria are situated in regions once thought to possess absolute curative climatic power, and the altitude of Fort Bayard is the highest of any locality mentioned in the table with the exception of Fort Stanton. This should prove sufficiently that climate cannot influence materially a tuberculous process and that a tuberculous patient who cannot get an arrest at home cannot obtain it elsewhere.

The Pottenger Sanatorium, situated at a comparatively low altitude (1000 feet) above sea level and with a wide range of temperature, shows the best results. Dr. Pottenger does not attribute his success to climate but to "all measures which aid in building up and nourishing the body, such as open air; good food; the careful adaptation of rest and exercise; suitable baths and medicinal tonics; to the end that the cells will be as responsive as possible; then furnishing the toxin necessary to stimulate the cells to the

Place.	Altitude. Feet.	Range of temperature.	Capacity of bed.	No of cases 1910-1911.	Apparently cured.	Disease arrested.	Improved.	Unimproved.	Died.
					Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Barlow Sanatorium, Los Angeles, Cal.	330	94° to 30° F.	40	59	9 (15.59)	21 (35.59)	11 (18.64)	10 (16.95)	8 (13.56)
Pottenger Sanatorium, Monrovia, Cal.	1000	109° to 31° F.	100	About 200	Beginning Advanced Average	cases 80 30 55	Not given	Not given	Not given
United States Army Hospital, Fort Bayard, New Mexico	6100	102° to 30° F. below zero	400	435	12 (2.76)	17 (3.91)	178 (40.7)	177 (40.7)	50 (11.7)
United States Army Hospital, Fort Stanton, New Mexico	6200	83° to 21° F.	250	144	23 (16.00)	26 (18.00)	23 (16.0)	28 (19.4)	41 (28.4)
United States Naval Hospital, Las Animas, Colorado	3800	103° to 20° F. below zero	238	213	28 (13.10)	20 (9.40)	82 (38.5)	50 (23.4)	33 (15.5)
Union Printers' Home, Colorado Springs, Colorado	6035	94° to 15° F. below zero	54	34	6 (17.60)	9 (26.10)	11 (32.3)	8 (23.5)	
National Jewish Hospital, Denver, Colorado	5280	100° to 29° F. below zero	130	224	52 (23.20)	49 (21.80)	33 (14.7)	79 (31.2)	7 (3.1)
Colfax School for the Tuberculous Colfax, Cal.	2420	107.5° to 32° F.	50	128	6 (4.70)	39 (30.40)	35 (27.5)	40 (31.2)	8 (6.2)
Maricopa Hospital, Arizona . .	1200	118° to 28° F.	25	99	....	5 (5.50)	5 (5.5)	15 (16.5)	64 (64.1)
Walter Henry Memorial Sanatorium, Seattle, Wash.	300	86° to 22° F.	31	48	1 (2.10)	2 (4.20)	22 (45.8)	13 (27.0)	10 (21.0)
San Francisco (Author) . . .	18	49.2° to 87° F.	..	1909-1911 210	31 (14.70)	74 (35.20)	34 (16.2)	36 (17.1)	35 (16.7)

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[4] Dr. Pottenger would not segregate his cases, stating that he averaged about 80 per cent. of cures and arrests in beginning cases and about 30 per cent. in advanced cases. This would make an average of 55 per cent. apparent cures and arrests.

production of protective substances as is done by intelligently employing tuberculin." He also lays great stress upon individualization, stating that "no physician can obtain the best results unless he can see something beyond tuberculosis and recognize the fact that tuberculous patients are drawn from the mass of human beings, hence liable to all the ills of un-tuberculous individuals."

Dr. M. Collins, in charge of the National Jewish Hospital for Consumptives at Denver, states: "I consider results obtained to a large degree due to our climatic conditions as well as to the *care, discipline,* and *attention* which our patients receive in the hospital itself." His apparent cures were 23.2 per cent.; arrests, 21.8 per cent. At Fort Stanton, New Mexico (United States Army Hospital), Dr. F. Smith in charge states that various degrees of importance are attached to the climate of this particular locality by different men. Fort Stanton shows 16 per cent. of apparent cures and 18 per cent. of arrests, while Fort Bayard for chronic cases in practically the same locality shows only 2.7 per cent cures and 3.9 per cent arrests. Dr. Smith in a recent publication states "sometimes a change is either unnecessary or useless, and moreover a climate adapted to the needs of one individual may be wholly unsuited to those of another." The Barlow Sanatorium, which shows apparent cures 15.25 per cent. and arrests 35.59 per cent. through its superintendent, Dr. R. L. Cunningham, makes this statement; "I do not consider this locality as favorable as certain places in Arizona or New Mexico and even some points of California on the desert," and still the Barlow Sanatorium shows better results than the Maricopa Hospital in Arizona, the Fort Stanton Hospital in New Mexico, or the Peers School for the Tuberculous at Colfax.

Dr. Peers, of Colfax, a careful observer, attributes his results to change of climate, freedom from fog and contaminating organization, and ability to live the outdoor life without discomfort 365 days in the year.

Now, to compare the above results with my own in 210 cases, treated at practically sea level, some in a sanatorium but the majority at home, ambulant. Before doing so I wish to make one observation: A just comparison can only be made if apparent cures and arrests are grouped, because we naturally all have different ways of construing results and what one dubs an apparent cure another may call an arrest. Personally, I am careful how I list a case as cured, since many of my cases which at the end of treatment were symptomless have relapsed in from six months to one year. I have also treated many cases which have been discharged from various sanatoria as cured. We all know the inaccuracy of statistics, and only by following our cases can our reports be exact. All the cases here reported have been under observation at least three years, and with but few exceptions their conditions at the present time are known. In the attempt, therefore, to be as conservative as possible, I can report of 210 cases, apparently cured, 14.7 per cent.; arrested, 35.2 per cent.; total, 49.9 per cent., practically a 50 per cent. successful result in a series in which the cases were not selective but taken at random from all classes of people. Tabulating together apparent cures and arrests from the various places under discussion we have: Barlow Sanatorium, 50.8 per cent.; Pottenger Sanatorium, 55 per cent.; United States Army Hospital at Fort Bayard, 6.67 per cent.; United States Army Hospital at Fort Stanton, 34 per cent.; United States Army Hospital at Las Animas, 22.5 per cent.; Union Printers' Home, Col. Springs, Col., 43.23 per cent.; National Jewish Hospital, Denver, Col., 45 per cent.; Colfax School for the Tuberculous, Cal., 35.1 per cent.; Maricopa Hospital, Arizona, 5.5 per cent.; Walter Henry Memorial Sanatorium, Seattle, Wash., 6.3 per cent.; Author (San Francisco), 49.9 per cent.

A survey of this grouping will show that my results are practically as good as those obtained at other places despite the fact that the climate of San Francisco has always been regarded as impossible for the cure of tuberculosis. To be sure, the net result in any report of cases will depend largely upon the number of advanced cases handled, but I feel certain that my present series contains as many advanced cases as the majority of sanatoria in the statistical table. This is demonstrated by a death rate in the series of 16.7 per cent., with no improvement in 17.1 per cent.

I am convinced that climate today plays the least important role of any of our therapeutic aids to the treatment of pulmonary tuberculosis. The fact is becoming more and more evident that the war against tuberculosis must be waged by each community within its own borders and not as heretofore each community shirking responsibility by making some other its dumping ground. Relapses are most common in patients who have received a cure in one climate and who attempt to live in another. Consequently, a tubercular should live in the climate in which he has been cured which must naturally be his home climate.

We must not deceive ourselves in believing that the therapeutic millenium of tuberculosis has arrived, and that we can absolutely cure it. We none of us know how many of our cures or arrests will stand the test of time.

In conclusion, this much I want to set forth with positiveness. If climate shall in future be disregarded and communities develop phthisiotherapists who in their own climate will build up a faulty metabolism of their patients through rest, open air, and proper feeding in order to, with the aid of tuberculin, stimulate the generation of antibodies within the body, a long step forward will have made in the therapy of tuberculosis.

I wish to express my thanks to the various directors and superintendents of the sanatoria and institutions above mentioned who have so willingly and kindly assisted me in making this report possible.